Space Weather Forecast

Issued on Monday, 04 September 2023 at 13:15 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: A chance of further isolated Moderate-class flares through day 1 (04 Sep), becoming a slight chance going forward. A slight chance of G1/Minor Storm conditions day 1 (04 Sep) into day 2 (05 Sep).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low activity with a number of Common class flares over the past 24hrs. These have mainly come from the sunspot region that has rotated off the visible disc, with the largest Common class flare from this region. Other Common class flares have come from sunspot regions on the visible disc, most commonly from a region in the northeast. Eight sunspot regions are present on the visible disc. A sunspot region in the northeast has shown the most growth and some activity, with some complexity in its configuration. Elsewhere on the disc, most regions have remained stable or are showing some signs of decay with only a couple of new areas of growth. Two areas in the northeast have developed and are worth keeping an eye to see if they become more complex. Coronal Mass Ejections (CMEs) associated with numerous flares the active sunspot region in the northwest in the past 24/36 hours are not Earth-directed. Further CMEs emitted in the past day are also expected to miss Earth.

Solar Wind / Geomagnetic Activity: Ongoing fast winds from a coronal hole have slowly declined through the start of the period, before becoming steady. Slightly Elevated solar winds were observed at first, with solar winds generally showing a decreasing trend, falling close to Slow, occasionally dipping below at times. Total Interplanetary Magnetic Field (IMF) was largely Weak. A minor, but abrupt increase was observed at 03/1550 UTC, perhaps indicative of a weak CME arrival. The north-south direction was predominately negative (southward) at first, briefly becoming positive before returning back negative. More recently is has become fairly neutral. Geomagnetic activity has been mostly Unsettled (Kp3), but with some Quiet intervals from 03/1800 UTC onwards.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at normal background levels throughout.

Four-Day Space Weather Forecast Summary

Solar Activity: A chance of further Moderate activity through the period, with isolated M-flares possible, most likely from a region in the northeast which is currently showing the most complexity.

Solar Wind / Geomagnetic Activity: Solar winds under the influence of the fast wind from a coronal hole should continue on day 1 (04 Sep) before another coronal hole likely increases speeds to Elevated once again into day 2 (05 Sep). This is one of a few fast wind influences that could occur through the period with enhanced winds continuing throughout. There is a slight chance of a glancing impact from a CME on day 2. Mainly mainly Quiet to Unsettled (Kp0-3) at first on day 1 (04 Sep), but likely increasing to Unsettled or Active (Kp3-4) again later in the UTC day or into day 2 (05 Sep), with a slight chance of G1 Minor Storm (Kp5) intervals. Activity through the rest of the period is likely to vary mainly between Quiet and Unsettled, but with a

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slight chance of isolated G1 Minor Storm intervals.

Energetic Particles / Solar Radiation: High energy protons are expected to continue at background levels, but with a slight chance for a Minor proton storm (S1) on day 1 (04 Sep), in association with any further notable flares from the active sunspot that has just rotated over the northwest limb. As this area rotates further around the far side by day 2 (05 Sep) the risk is much reduced.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	20	10	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	25	20	20	20
Very Active	R3 to R5 X	No	2	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	2	2	2
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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